

REDWINGED STARLINGS OF KENYA

By

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The redwinged starlings of the genus Onychognathus, Stilbopsar and Galeopsar are a rather distinct and interesting group differing in several of their habits from other glossy starlings in East Africa. In all species the plumage is predominantly glossy black, with some grey about the head and neck in the females. In flight the primaries appear chestnut, usually in both sexes, but in Stilbopsar only in the female. The tail is usually elongated and graduated to a greater or lesser degree, and all species are more or less gregarious. With two other genera the Abyssinian White-billed Starling (Pilorhinus albirostris (Rüppell)) and the Narrow-tailed Starling (Poeoptera lugubris Bonaparte), which just reaches East Africa in Western Uganda, they form a convenient natural group or superspecies.

Six species of Redwings occur in Kenya, five of which I have seen and two of which I have studied in some detail. The observations on which the majority of this paper are based were made chiefly at Embu, on the eastern slopes of Mount Kenya, where I was Agricultural Officer between 1947 and 1952. In my garden there were a number of quick-growing Trema orientalis (L.) Bl. trees which produced an abundant crop of small black berries almost all the year round. They proved a great attraction to several species of starlings and other fruit-eating birds, including three species of redwings. Since leaving Embu I have made sporadic observations all over Kenya, but have never been able to do much more detailed work on any of the species concerned. My observations are summarised in the paragraphs which follow.

Genus ONYCHOGNATHUS

Onychognathus walleri (Shelley), Waller's Chestnut-wing Starling.

Two races of this species occur in Kenya (O.w.walleri (Shelley) of Kenya, and Kilimanjaro, and O.w.elgonensis (Sharpe) in western Kenya and Uganda. They are birds of forest at altitudes usually above 6,000 feet and there seems to be little difference in their habits. I have found both races rather uncommon and unobtrusive birds of the forest canopy, living usually in pairs or small flocks. I have seen the western race frequenting the dead trees of cultivation clearings and a pair of O.w.walleri were seen in the large Podocarpus trees at the Ngorongoro rest camp in January 1958. So far as my observations go the species is not so obviously gregarious as some other members of the genus. I have no personal acquaintance with their nesting habits, but in the Usambaras they have been seen breeding in holes in tall trees, while Jackson (3) records a nest with young 30 ft up in a tree in Nandi on 4th June. According to published records the breeding season appears to be protracted but is most likely to be concentrated during the rains. The eggs have never been described.

Onychognathus morio ruepellii (Verreaux), East African Redwing.

This is the East African representative of a species widespread in Africa which, with the march of civilisation, is becoming increasingly

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commensal with man. In Kenya it is common in suitable localities East of the Rift, and as far North as the Matthews Range, but it is not common in most of Western Kenya except on Mount Elgon. Here I have found it fairly numerous among caves at about 5,000 - 6,000 ft. Another race O.m.montanus Van Someren is said to occur on the higher slopes of Mount Elgon above 9,000 ft and to differ from the East African race in having a more slender bill. Other races occur in South and West Africa, and are similar in their general habits to the East African race.

O.m.ruepellii is commonest about rocky inselbergs, where it frequents the rock faces in flocks of up to thirty, separating into pairs in the breeding season. It is not usually common in areas with rainfall of less than 25 inches, and in such areas is confined to rocky hills with small patches of forest. It roosts and breeds in holes in rock faces. On Mount Kenya and Mount Elgon it frequents caves and rocky gorges and I have not seen it above the forest line on either of these mountains. It is common in cultivated country of good rainfall provided there are suitable nesting sites, and has undoubtedly increased in numbers in such country with the increase in permanent buildings, bridges etc., that has taken place in the last fifteen years.

The best way of distinguishing this species from the Slender-billed Chestnut-wing is by its call, a sweet melodious whistle "Wheee-oh". The sound of this call proclaims the presence of the species round rocky crags where the observer cannot venture too close to the edge. This call, however, is similar to one call of Galeopsar salvadori. They also have a harsh alarm call "Chrraa," uttered when an enemy is near the nest. This note was also used by a male to threaten individuals of the closely related O. tenuirostris that came to feed in the Irema trees near my house, but was not used to other starlings e.g. Lamprocolius and Creatophora in the same trees. When soliciting food in courtship the female makes a chissiking call like a young bird, and when at the nest together the pair utter a variety of soft subdued whistles.

At Embu, where I studied this species closely, the natural habitat on the slopes of Mount Kenya was the deep-cut river gorges in volcanic rocks. Here the starlings nested in caves or under single volcanic boulders where these were large enough to provide an inaccessible and overhung nesting site. They also occurred commonly on rocky kopjes and hills at lower altitudes. Most nests in natural sites are inaccessible to predators and I found only one that I could reach without a ladder. All were substantial structures with a base of small sticks and vegetable fibres supported and held together by mud, with a cup in the centre lined with fine rootlets and grass stems.

With the spread of permanent buildings in Embu boma several pairs colonised the new nesting habitat, and the two known "building" pairs in 1947 had increased to at least six pairs by 1952. One pair lived in my chimney and were observed for four years continuously, and sporadically after that till the site was abandoned. The species also breeds in Nairobi, and a pair bred within earshot of my office in the Ministry of Agriculture in 1962 and 1963.

The pair that lived in my chimney were most attractive birds, nearly always together, and apparently very devoted to each other and to the nest site. In this they seemed typical of other pairs observed

round Embu, whether in a natural or a man-made nesting site. The nest site is used for roosting outside the breeding season, and all known nest sites have been used for many years in succession, though whether by the same birds is not known.

The pair in my chimney first attempted to breed in May 1947, but were discouraged by the fires we lit in that very wet year. I removed the nest, but they returned and built a new one during the short rains October-December 1947. In this case the nest cup was lined with the fine hair-like leaves of a Casuarina tree three hundred yards away in the District Commissioner's garden. The pair began to build in October but finally laid eggs only in January.

At the onset of the breeding season the male fed the female in the nesting recess, in one case with what looked like pawpaw (Carica papaya L.). Just after such courtship feeding both sexes would collect small sticks from a tree in my garden, but usually dropped them without taking them to the nest. The female would later go to the nest while the male perched in a Trema tree and sang in a series of soft whistles. Building began in earnest after this stage.

In 1947 and in subsequent years both sexes built or repaired the nest. The male brought most of the material while the female remained in the nest ledge working with what he brought. Sometimes she too brought material.

In 1947 the nest was reconstructed, beginning in October with a new foundation of mud, continuing through November with the addition of sticks, pieces of bark etc. and reaching the lining stage in December. On 6.1.48 the nest was complete but empty, and on 10.1.48 contained the full clutch. With this pair, therefore, the construction of a new nest took about three months, while the repair of the same nest in subsequent seasons occupied about six weeks. These prolonged periods are much longer than observed in the South African race (Rowan; 5). During the nest building and repair periods the pair roosted together in the nest recess.

1949 was an exceptionally dry year, with a near-total failure of the short rains in October-November. The birds did not breed in the chimney at the usual time, and visited the nest only sporadically. They did not begin nest repair in earnest till the early break of the long rains 1950, with heavy rain in early March. As in the case of the related O. tenuirostris the rains seemed to bring them into breeding condition with a rush. In March they began building rapidly, and had completed the nest by the first week in April. On 11th April it contained the full clutch.

In each year of observation this pair laid three eggs. They were laid on consecutive days, and were pale blue, handsomely spotted with red-brown, with lilac and grey undermarkings. A clutch of two from another nest, now in the Coryndon Museum, Nairobi, averaged 34.2 x 23.3 mm. Although these eggs were fresh the birds did not lay a second clutch after they were taken. All clutches I have seen were of three eggs, except the one noted above of two, (which may not have been completed). I have known clutches laid in August (1) October (1) November (1) December (1) January (2) April (1). The April clutch was clearly at an abnormal time due to unusual weather conditions and from observations of other nests with young it seems clear that at Embu the main breeding season was November to February.

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Incubation proper begins with the completion of the clutch, although the female could have incubated at night since she slept in the chimney recess. Two complete incubation periods were recorded, both of 14 days. Broekhuysen (1) working with the South African O.m.morio recorded an incubation period of at least 25 days while Rowan (op. cit.) recorded a variation of 12-23 days, with an average of about 16 days. Such remarkable variations have yet to be shown in Kenya birds, which are perhaps under lesser pressure to complete their breeding cycle than are the South African birds living in a temperate climate, and could therefore be expected to have still more variable breeding cycles.

Almost all the incubation was done by the female, but on one occasion the male was recorded sitting. The pair slept together in the nest recess, and during the incubation period the male was usually in close attendance, perching in the Trema trees close by. He was not seen to feed the female in the nest, but may have done so. The female left the nest rather often to feed and when she did so the male went with her; the pair usually flew down into a valley and out of sight. On return the female would go into the nest, and the male again perch in the Trema trees. Such behaviour seems typical of the species (of. Rowan op. cit.), and of the related O. tenuirostris.

The young of the Embu birds hatched simultaneously, indicating that incubation had not been consistent, even at night, until the clutch was complete. Rowan (op. cit.) records a difference of about 48 hours between the hatching the first and last eggs in just over half the observed cases, and simultaneous hatching in others. For some time after the hatch both sexes roosted with the brood in the chimney recess and were often noisy until quite late at night.

In the early fledging period the female spent much time in the nest brooding the young, and the male brought food. After a few days, however, it was usual for the pair to go off together to fetch food, and return together. At this time both sexes fed the young, but the female rather more than the male. Up to the 14th day of the fledging period the female spent periods in the nest brooding the young after she had fed them; during these periods the male either sat in a nearby tree or went away alone and returned with more food. Most of my periods of observation were short, but an analysis of 13 hours watching on four days, gives an average feeding rate of just over 2 feeds per hour. This is a very much lower average rate than recorded by Rowan in South Africa, where the average rate was 8-12 feeds per hour with a maximum of 20 per hour. In my Embu birds the slower rate of feeding did not seem to have any adverse effect on the growth of the young. The feeding rate could easily have been accelerated had this been necessary. There was a tendency for the pair to bring several feeds in quick succession, followed by a break, and then some more. More feeds were given before 10 a.m. than at other times of the day. During the middle of the day the pair usually sat in the trees near the nest and scarcely fed the young.

The majority of the food brought to the young was fruit, particularly Trema berries. Other vegetable food brought included mulberries (which the young rejected and the male then swallowed), a kind of paste, looking like maize meal porridge, and other small berries. Some of the food was indistinguishable and looked like a mash of insects, but most of the insect food consisted of large insects such as stick

insects, mantids and grasshoppers. One large spider was brought to the young. The proportion of vegetable food to insect was probably at least two to one, possibly more.

Both sexes removed faecal pellets from the nest, and the male was seen to do so more often than the female; this may have been mere coincidence as few faecal pellets were deposited during the periods of observation.

Despite their devotion to the site and their general behaviour these birds were extraordinarily unsuccessful in rearing young. In each of four years they laid three eggs, yet they only succeeded in rearing one young one altogether, and that one a doubtful starter. In the first year, 1947, the three young disappeared at about 14 days old, probably taken by a cat at night. In 1948 one young one died in the nest early, and despite a precautionary barrier the other two fell down the chimney while I was away from home. One was dead when we found them and the other had a broken leg; I replaced it in the nest but it fell out again and finally died when it was 21 days old. In April 1950 the season of delayed breeding, two young disappeared from the nest and there was only one left 14 days after hatching. Again, despite precautions, this bird fell down the chimney while I was away, and the parents followed it down and fed it in my sitting room. It was 24 days old when found and would not remain in the nest when replaced. It could fly fairly well and was placed on the roof of an adjacent building where the parents fed it; it may have survived. The pair bred again in December 1950, but the young disappeared almost at once, taken by some predator. After the disappearance of the young in each year the parents continued to frequent the house and chimney, but never made an attempt to rear a second brood. I had evidence that this very low rate of breeding success was abnormal; other pairs in more inaccessible situations in roofs of other buildings seemed to be more successful.

This pair of starlings did not attempt to breed at the end of 1951 and eventually deserted the garden in 1952. The Irema trees, which are very brittle, began to shed their branches as they grew old and had to be cut down. Possibly the removal of this readily available source of food a few yards from their nest was a contributory cause of the abandonment of the site, which has not been occupied by another pair since.

Onychognathus tenuirostris (Ruppell), Slender-billed Chestnut-wing.

Two races of this species occur in Kenya O.t.tenuirostris found on Mount Kenya, and O.t.theresae Meinertzhagen, on the Aberdares and west to Ruanda Urundi and south to S. Tanganyika. The races are only doubtfully distinct. I have seen O.t.tenuirostris in the highlands of Ethiopia and I have studied both races closely in the vicinity of Nyeri, and can state that there is no practical difference in their habits. The headquarters of the species in Kenya is on Mount Kenya and the Aberdares. It is not common on Mount Elgon or on the Mau range. In Ethiopia it is numerous in Semien but uncommon East and South of the Rift Valley.

This is one of the most delightful of all our starlings, gregarious at all times, active, excitable and noisy. As a rule it is not found below the natural level of forest but is common in cultivated areas in the former forest zone on Mount Kenya and the Aberdares. It goes up onto the high moorlands of the mountains to feed, but it is

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typically a bird of the forest zone, from 4,500 to 10,000 ft. Although flocks move about a great deal they are always based on river valleys, and roost and breed in caves under and near waterfalls. Indeed, it is probably the geological formation of Mount Kenya and the Aberdares, which results in numerous small waterfalls with caves in the softer material under a hard rock sill that enables the species to be so common there. There are far fewer suitable breeding and roosting caves on Mount Elgon, or the Mau range.

This species is easily distinguished from O. morio by the following features (i). It is intensely gregarious, hardly ever seen except in flocks, which are usually large (ii). Its calls which, in contrast to those of O. morio, are sharp and piercing. A characteristic alarm note when taking wing is a high-pitched "pleek", and a flock keeps up a continuous sharp whistling and chattering. It never emits a mellow whistle like O. morio. (iii). In adults the two central tail feathers are more elongated than the rest, and project as a distinct stub (diagram); this character enables individuals to be recognised (iv). It is a much more active, quick-moving, and excitable species generally, and strongly attached to water.

It would be more difficult to distinguish O. tenuirostris from the Bristle-crowned Chestnut-wing, Galeopsar salvadori, which has a very similar flight silhouette with elongated central tail feathers. However it is very unlikely that the two species would be seen in the same type of country, and the bristly crown of Galeopsar is diagnostic at close range.

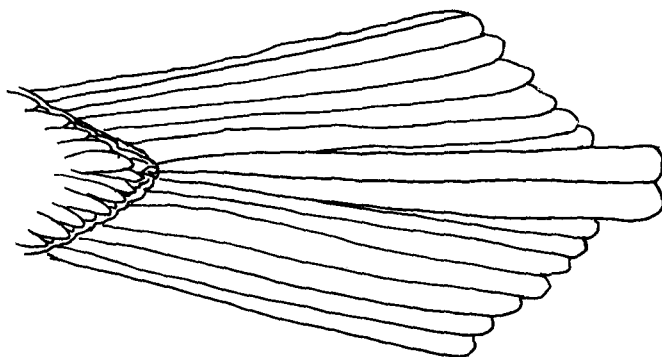
Flocks of this species live in caves in river gorges, almost always near a waterfall. A favourite roosting cave is at the waterfall on the Chania River just above the Outspan Hotel at Nyeri. The birds generally roost on dry ledges beside the fall, but sometimes enter the cave behind the falling curtain of water. Not all roosting caves are used as breeding sites.

The general habits are to leave the roosting cave early in the morning and to move to a favoured locality. At certain seasons flocks of hundreds used to feed in the Trema trees in my garden at Embu. In 1947, a year of heavy rainfall, they were absent from April to June, but present for the rest of the year. Local movements appeared to vary a good deal according to the rains, and were probably connected with the availability of favoured food supplies. The Trema trees were nearly always in fruit, hence the starlings spent much time in my garden.

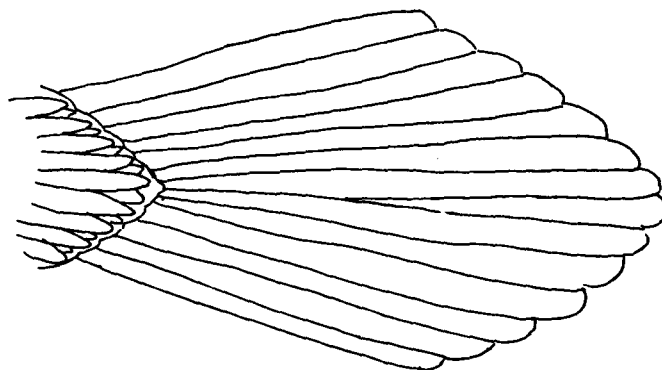
The birds return to their roosting caves in the evening, from 4.p.m. onwards. Before roosting they often bathe in the stream, but not necessarily at the roosting site. At the Outspan cave the number roosting reached a peak in March with 80-85 birds. On 5.11.52 there were 40, on 28.2.53 60-65; and on 17.4.53 again 60-65. Where a roosting cave is also a breeding site the numbers roosting are invariably far in excess of the breeding birds. At a small waterfall at Karurumwe in Embu district there were regularly 20-30 roosters, but only two nest sites. Of 34 counted one evening only 6 were adult females, the rest males and immatures. In fact the breeding birds would seem to be only a small proportion of the total population of the species.

The species is common on the moorlands of Mount Kenya and the Aberdares, but it is not so common generally at high altitudes as in

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Tail of
Onychognathus tenuirostris
adult



Tail of
Onychognathus morio
adult

the cultivated areas below the forest. It has been seen at above 15,000 ft. around the high crags of Point John and above Two Tarn Col, but flocks usually stick to the zone of vegetation. Here they frequent cliff faces, going in and out of holes, and it was probably this that led Mackinder to suppose that they bred at these high altitudes in August (Moreau: 4). Inter alia these starlings feed on small, yellowish, soft-shelled snails on the high moorlands (J.G. Williams, in litt.) They also feed among giant lobelias both in Kenya and Ethiopia. In Ethiopia they ascend to the high moorlands of Semien daily, returning to caves low down on the tremendous crags at night. Occasionally they roost at high altitudes; for instance a flock roosted in a cave at the base of Hall Tarn Crag on Mount Kenya on 13.3.52. But it is probable that most of the birds seen on the high moorlands of Mount Kenya descend to lower levels to roost. This view agrees with Chapin's (2) observations.

The Slender-billed Chestnut-wing breeds singly or in small colonies in caves under waterfalls at altitudes from 4,300 - 7,000 ft. I have found nests also at 3,800 ft. on the Nyamini River in Embu district, and at 10,500 ft. on the Kathenju River at the upper limit of forest on Mount Kenya. The highest nest I have found was in a cave at a waterfall above the Nithi Falls, at about 11,000 ft on Mount Kenya. But these upper and lower nests were apparently not occupied at the normal breeding season for the species, and it remains to be proved whether they ever breed successfully above or below the forest zone. There is, for instance, no visible nest under the very suitable Queen's Fall on the Aberdares.

The nest sites in the caves are usually in moist but not very wet situations. They are inaccessible because of the falling water and are sometimes placed on the rock face among vegetation such as ferns and moss, at other times placed in dark crannies in the depths of the cave behind the fall. I have found one nest at the end of a tunnel, in partial darkness. Most suitable waterfalls have several pairs nesting behind them, but the largest number of breeding pairs found at any waterfall was four. In the caves the nests are spaced well apart, and there may be suitable sites without a nest. Although colonial and gregarious therefore, this starling appears to maintain a definite spacing between actual nest sites. The immediate vicinity of the nest site is defended by the male, who drives away immatures and strange adults that often come to bathe in the falling water.

The nests are built of moss on a foundation of mud, and lined with grass. Both sexes build and the share of the sexes is fairly equally divided. At one nest near Nyeri the male made three and the female four trips with moss in 25 minutes. The nests are likely to disintegrate during periods of flood, when the caves behind the waterfall are soaked with spray, and they have to be largely rebuilt each year. The same sites are used year after year, presumably by different birds. One site known is still in use sixteen years after it was first found in 1948.

Nest repair and other activities appear largely to be controlled by the level of water in the river. When the river is in flood the birds cannot build or breed, and they must wait till it recedes. Equally, in periods of drought, breeding seems to be inhibited. At one colony, on the Kapinazi River at Embu, the failure of the short rains in October 1949 shrank the river to nothing, and though the main breeding season is October-March the birds here did not begin nest repair

till early in March after the first rains had restored some flow in the river. Nest repairs may be prolonged over four months from October to February, or it may be short and compressed as in the Kapingazi colony in 1950, when the birds came into breeding condition with a rush and had laid eggs ten days after the onset of marked activity. The general pattern probably varies with the site. On a small river the flow of water is sometimes not great enough to prevent activity even in the rains, but on larger rivers breeding must be concentrated in periods of low water. At the same time the larger and more successful colonies are probably situated in inaccessible caves behind waterfalls on the larger rivers.

Two to four eggs are laid on consecutive days. In eleven clutches there were 1 C2, 8 C3, and 2 C4: mean 3.1. The eggs are clear pale blue, sometimes finely spotted with red-brown all over, or sometimes with larger, more blotchy markings. Three eggs averaged 33.5 x 32.8 mm. If a clutch is taken a second may be laid; a clutch of three taken for the Coryndon Museum on 1.2.48 was replaced by 23.3.48. Clutches have been found as follows (Some laying dates estimated from young in the nest) September, 1; November, 1; January, 2; February, 10; March, 7 (including one replacement clutch). The September and November nests were in the Aberdares near Nyeri, all the others in Embu or Meru districts on Mount Kenya. Thus although the breeding season is rather variable it appears to be concentrated between January and March, a dry season with minimum water levels.

Incubation begins with the completion of the clutch, and takes 13 days or a little less. In three observed cases there was no variation in the incubation period. The female alone incubated in all observed nests, and she was fed at the nest by the male. She would sometimes leave the nest at the male's approach, perch on a boulder and solicit him with beak open (presumably calling, but inaudible in the roar of the fall). The male usually regurgitated food he was carrying in his crop direct into the female's bill. Sometimes he visited the nest site without food; on such occasions the female would leave the nest, solicit unsuccessfully, and return after a few moments.

The young are feeble and quiescent when first hatched, but become quite active by the third day. Even at this early stage they are left alone in the nest by the female for considerable periods. The female alone broods the young, brooding all night and for periods during the day. At two nests with young two and three days old females brooded during most of a morning's observations. In 195 minutes at one of these nests the female was brooding for 130 minutes and off the nest for 65 minutes, in 8 spells varying from 2-16 minutes. Her spells off were invariably associated with the visits of the male. In this time he fed the young four times and the female once, and paid five visits without feeding either young or female. The female fed the young three times, twice with food she had received from the male and once with food she had collected herself. After one visit by the male she fed young twice in succession, with an interval between feeds, with food received from him. On each of the male's visits the female would solicit him, sometimes leaving the nest to do so, and on one visit she was fed first before any food was delivered to the young. The nature of the food could not be ascertained as all was regurgitated. From observations at other nests this sort of behaviour seemed to be usual in the early fledging period.

Later in the fledging period the young were left alone in the nest

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for much of the time and the pair went off together to collect food, as in O. morio. At this stage they seemed to be very devoted to one another, and were usually in company, even when perched. The female appeared to stop brooding the young much by day after about 10 days, and when the pair returned together after a food foray she generally fed the young first. Both sexes removed faecal pellets, but the male seemed to do so more often than the female. The young can deposit faecal pellets outside the nest at 14 days old.

An experienced African observer, Njeru Kicho, who had worked with me for a number of years at several eagles' nests, watched at the colony from 11.4.50 to 4.5.50. He was required to record, by notching sticks, the number of feeds brought to each of three nests A, B, and C, on each day. When the observations began Nest A contained young 13 days old, Nest B young 12 days old, and Nest C young 19 days old. In 65 hours observation on 18 days, between the hours of 8 a.m. and 4 p.m., but not the same hours every day, he recorded 465 feeds, 186 at Nest B with the smallest young and 127 at Nest C with the largest young. The average rate of feeding at all nests was 2.4/nest/hour in the first four consecutive days 11-14.4.50, and fell to 1.74/nest/hour in the last four consecutive days 26-29.4.50. Two days afterwards, on 1.5.50, a feeding rate of 2.89/nest/hour was recorded, and on 4.5.50, when the young in Nest B and C were free of the nest, the rate had fallen to 0.83/nest/hour. The highest individual rate of feeding was 5.0 feeds/hour at Nest B on 18.4.50 and the lowest, apart from the last days observation, 1.1/hour at Nest A on 26.4.50. These observations are quite consistent with an average rate of feeding of 2.38/nest per hour recorded by myself at Nest A, from a hide, on 2 and 6.4.50.

The behaviour of the females was largely controlled by the level of water in the rivers. 13th-15th April was a period of heavy flood. At nests A and B, which on 13.4.50 contained young 15 and 14 days old respectively, the female remained in the nest all the time and received all food from the male. Even at Nest C, in which the young were 21 days old on 13.4.50, the female remained beside the nest all the time and did not leave to feed. Thereafter the water level fell somewhat, but remained consistently high till the end of the observation period. In the following week, however, when the young in nests A, and B, were 22-23 days old, and those in nest C were about 30 days old, they were left alone in the nests by the females despite further heavy floods.

In fact these young must have been almost fully fledged at this time. In 1949 at the same colony the fledging period was recorded as at least 23 days and probably slightly longer. In the closely related O. morio the fledging period is about 24 days in Kenya. In normal circumstances, with eggs laid in January or February, the young would be able to leave the nest in February or early March, when water levels are at their lowest. But in 1950, when the birds did not start to breed until the onset of the long rains in March, the young remained much longer than usual in the nests. The young in Nest C had only just left the nest on 4.5.50, when they were 42 days old; those in Nest B, 35 days old, left the nest to receive food but returned to it later, and those in Nest A had not left when 36 days old. Thus they must have remained in the nest, though probably quite able to fly, for at least ten days longer than normal. This can only have been due to the high level of the river.

After leaving the nest young and adults return to the vicinity to roost. The sexes are indistinguishable in the immature plumage, the

grey head of the female being acquired with maturity. Flocks of immatures and unattached adults often visit the nest site while breeding is in progress, and if they go too close to the nest sites they are repelled by the breeding males. However, adults will feed young with immature birds perched within a foot or two of them. The age at which adult plumage is acquired is not known, but adult breeding females are always a small proportion of the combined flock at a breeding site. Further information is needed on the total population in relation to the number of nest sites, but all the available evidence is to the effect that it is impossible for all available adults to breed annually.

Breeding success in the Kapingazi River colony in the two seasons in which it was observed was rather low. In 1948, from four nests in which at least 12 eggs had been laid, only five young certainly hatched, and of these only one flew. In 1950 at the same colony, of 13 eggs laid in four nests three were lost in incubation, and one was addled in Nest C. Of the nine young that hatched six flew. This gives a mean breeding success in two years from four nests of 0.88 young per pair per annum - no better than in many large raptors. Of eggs laid 28% produced fledged young; and of young hatched 50% reached the flying stage. Observations at other breeding sites tend to confirm that this poor performance is usual. Inaccessible nests, either high up on the rock face among vegetation, or in deep caves behind difficult falls, may have a higher rate of success than easily accessible nests in dry caves; the one easily accessible Kapingazi nest failed in both years.

The small proportion of breeding females, and the rather low breeding success achieved even by those indicate that to attain the numbers that actually exist the species must be long-lived. Further quantitative observations, if possible supported by ringing, are needed to elucidate these points.

Galeopsar salvadori Sharpe, Bristle-crowned Chestnut-wing.

This species is an inhabitant of semi-arid country from north of the N. Guaso Nyiro to Turkana, and southwards down the Rift Valley to the neighbourhood of Lake Hannington. I have found it locally common at Marsabit and in the Turkwell Gorge in Turkana, where it is very common and takes the place of Onychognathus morio. In Baringo district it is rather uncommon, frequenting chiefly the vicinity of rocky gorges.

At Marsabit flocks seasonally visit the township area, and come to drink at a small pool in the Regional Government Agent's garden. Here their behaviour is very reminiscent of the chattering flocks of Slender-billed Chestnut-wing C. tenuirostris in Embu township. The birds would come down to the pool in ones and twos till it was surrounded by a ring of them. They would then take sudden alarm and fly to trees in the garden, whence they would again gradually descend. When drinking they often drank in unison, all lowering and raising their heads together. This drinking behaviour was seen on 23-24.9.60, but not on subsequent visits on 21-22.3.62, or on 9-11.10.63 or 9-10.12.63. It is possibly connected with severe drought conditions. In September 1960 they had evidently been feeding on purple fruits.

In its general habits this species behaves like a combination of O. morio and O. tenuirostris but its range is different and its normal habitat is much drier. I have found it most commonly frequenting the larger trees along drainage lines, but have also met with it in thin open thornbush. At Marsabit and in Turkana it is fond of rocky places, like O. morio.

Redwinged Starlings of Kenya

At close quarters this species can be distinguished from any Onychognathus species by its crown of bristles, which gives the head a distinctive silhouette. However, this is not as obvious in the field as it might seem. In flight it can be distinguished from O. morio by the projecting elongated central tail feathers. Calls are no help at all. At Marsabit the drinking birds were heard chattering shrilly in the manner of O. tenuirostris, and they also emitted a similar but rather lower-pitched and harsher "kleek" than that species. However at the Turkwell gorge they were at first confused with O. morio because of the sweet whistling cries "sweee-oh" they uttered. These calls do not appear to have been described before.

Stilbopsar kenricki (Shelley), Kenrick's Starling.

This species, found in Kenya east of the Rift and Tanganyika is barely distinct from Stuhlman's starling S. stuhlmanni of Western Kenya and Uganda. The race found on Mount Kenya is S.k.bensoni Van Someren. It is a forest bird which occurred seasonally at Embu as low as 4,500 feet. Flocks frequented my garden at the height of the rains, in May 1947, and again for some time in July 1947, when there was heavy mist. They only visited my garden in the wettest weather and in years of heavy rainfall; they did not come at all in 1948 or in 1949, and in 1950 only came in May. These visiting flocks probably came from the Njukiini forest not far away, and like other starlings at Embu they fed in the Trema trees. They were, however, present at a time of year when hardly any other starlings were in the garden. Four specimens were collected in 1949 and are in the Coryndon Museum, Nairobi.

The nest is made in a hole in a tree, but the eggs have never been described. I saw a pair prospecting an old barbet's hole in a dead tree on the edge of Njukiini forest in 1948, but was unable to reach this possible nest site. On a later visit the birds were not seen and had probably not bred in the hole.

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REDWINGED STARLINGS OF KENYA



PLATE I Female on ledge below nest, showing shape of tail

REDWINGED STARLINGS OF KENYA

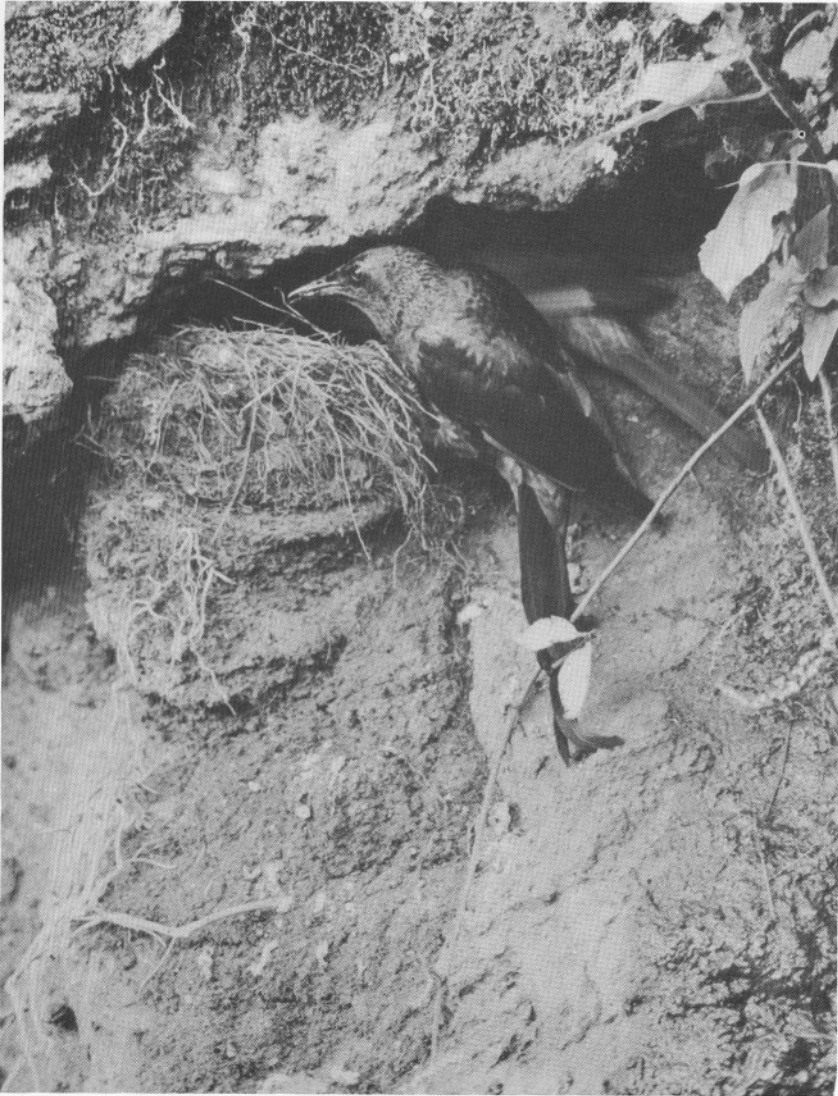


PLATE II Male feeding young, female obscured behind him



PLATE III A short-tailed immature "visiting" the nest;
such birds are repelled by the adults



PLATE IV Typical breeding site of single pair. The nest, accessible only after a swim, is among the vegetation to the right of the waterfall